US Army Corps of Engineers®
Engineer Research and Development Center

Surge & Wave Island Modeling Studies (SWIMS)

Description

The U.S. Army Corps of Engineers areas of responsibility include many islands in the tropical Pacific and Atlantic Oceans. Typically, islands are volcanic, with narrow coasts and rugged interiors. Coastal roads and communities are a vital part of island society. Many island coasts face exposure to vast expanses of open ocean. Fortunately, wave climates are generally mild, but powerful tropical storms can occasionally strike. Often a protective coral reef helps shield island shores from the huge waves that can be generated in an intense storm. Nonetheless, island roads and communities can suffer great damage due to storm-raised water levels and high waves which break and run up on shore. Measurements of storm-generated waves and water levels along island coasts are now being collected under the Pacific Islands Land-Ocean Typhoon (PILOT) Experiment.

View Near Inarajan, U.S. Territory of Guam

Issue

Methodologies for analyzing hurricane/typhoon waves and their interaction with island coasts, including fringing coral reefs, have not received attention commensurate with the importance and complexity of the processes. SWIMS is a 5-year effort with initial funding in 2005. A next generation island coastal storm surge and wave model will be developed and validated. SWIMS validation will take advantage of field data collected under PILOT and physical model data collected under SWIMS and a preceding study. The SWIMS numerical model technology will be developed with recognition of the need to configure it for future practical coastal inundation applications.

Benefits

The new methodology will more realistically represent coastal inundation sites and processes. Wave, wind, and water level interaction with fringing reefs and coastal topography will be modeled more comprehensively and accurately than previously available model technology for island studies. Also, new physical model databases representative of island coasts will be available. The SWIMS numerical model and physical model products will lead to more reliable future studies for flood insurance, emergency management, and other applications.

Sponsors

U.S. Army Engineer District, Honolulu (HED); Hawaii State Civil Defense

Point of Contact

Mr. Jose E. Sanchez, CEERD-HN, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, e-mail: Jose.E.Sanchez@erdc.usace.army.mil. Additional information can be found at *http://chl.erdc.usace.army.mil*.